

from being subjected to undue force or stress tending to pull the actuator rod tip ends in a radial outward direction. Like the tactile device 261 shown in FIG. 24A, the tactile device 26 of FIG. 26 is durable and has a relatively long service life.

[0182] FIG. 27A shows in perspective the general configuration of a vehicle state information transmission apparatus 11B according to another preferred embodiment of the present invention. In this figure, these parts like or corresponding to those shown in FIG. 1 are designated by the same reference characters and no further description thereof is needed.

[0183] The vehicle state information transmission apparatus 11B of this embodiment will be differentiated from the apparatus of FIG. 1 in that the vehicle state information transmitting means or device 41B further comprises comprising a parked vehicle detection means or sensor 301 forming part of the vehicle state detection device 25 for detecting a vehicle while being in a parked state, an adjustment permission means 302 for permitting an operation amount adjustment of the tactile device 42 to start, an adjustment amount input means 303 for inputting an adjustment amount to thereby increase or decrease the operation amount of the tactile device 42, and a simulation means 304 for, on the basis of information pertaining to the parked vehicle detected by the parked vehicle sensor 301, information pertaining to the permission provided by the adjustment permission means 302, and information pertaining to the increase/decrease achieved by the adjustment amount input means 303; outputting information to activate the tactile device 42 in the same manner as it does during traveling of the vehicle, while the vehicle 12 is in a parked state.

[0184] In this embodiment, the term "adjustment amount" is used herein to refer to the frequency and amplitude of a tactile pattern (wave motion, for example) produced by the tactile device 42. The parked vehicle sensor 301 may take any form as long as it can detect the vehicle 12 while in the parked state. Accordingly, the parked vehicle sensor 301 may be substituted by the travel direction sensor 70, the vehicle speed sensor 81 (FIG. 2), or the parking brake sensor 84 (FIG. 2) for the purpose of downsizing and cost cutting.

[0185] The adjustment permission means 302 is provided to allow the operator to make an adjustment for the adjustment amount with respect to any of the first tactile device (in-wheel tactile device) 42, the second tactile device 201 (pedal tactile device 202 and floor tactile device 204) and the third tactile device (seat cushion tactile device) 231. The adjustment permission means 302 is comprised of a rotary switch disposed, for example, in a center console 308 and has an adjustment dial 307, as shown in FIG. 27B, which is manually actuatable for selecting a desired tactile device. The rotary switch serves also as an ON/OFF switch.

[0186] The adjustment amount input means 303 is provided for inputting an adjustment amount (i.e., frequency and amplitude of a desired tactile pattern) to thereby adjust (increase or decrease) the operation amount of the selected tactile device. For this purpose, the adjustment amount input means 303 is disposed next to the adjustment permission means or switch 302 on the center console 308 and has a minus-side input section 311 and a plus-side input section 312. When the driver desires to increase the operation amount of the selected tactile device, the plus-side input section 312 is actuated or pressed down to thereby change the table map in a side to increase the gradient of the controlled variable. Alternatively, if the driver desires to decrease the tactile

device operation amount, the minus-side input section 311 will be depressed to thereby change the table map in a side to decrease the gradient of the controlled variable. An adjustment to shift the table map while keeping the gradient constant or remain unchanged is also possible.

[0187] The simulation means 304 is configured to output a table map determined in accordance with the adjustment operation inputted from the adjustment amount input means 303 and preset vehicle travel conditions (changes in lateral acceleration and vehicle speed) while the vehicle is in the parked state.

[0188] Operation of the vehicle state information transmission apparatus 11B of the foregoing construction will be described below in detail with reference to a flowchart shown in FIG. 28. The operations performed in Steps ST201 to ST207 are the same as those performed in steps ST101 to ST107 shown in FIG. 13 discussed previously, and description will begin at step ST208.

[0189] Step ST208 determines whether the vehicle is in the parked state or not. If the determination shows the vehicle in the parked state (YES), the control procedure advances to step ST209. Alternatively, if the determination shows the vehicle in the unparked or traveling state (NO), the control procedure returns to step ST201.

[0190] Step ST209 reads in a signal from the adjustment permission means or switch 302. In this instance, the signal may include information about a target tactile device to be adjusted is selected. Subsequently, step ST210 determines whether the signal from the adjustment permission switch 302 is indicative of the ON state or not. If the determination shows the signal representing the ON state (YES), the control procedure goes on to step ST211. Alternatively, if the OFF state of the adjustment permission switch signal is determined (NO), the control procedure returns to step ST201.

[0191] Step ST211 selects a target tactile device to be adjusted based on the signal from the adjustment permission switch 302. Subsequently, step ST212 adjusts an operation amount of the selected tactile device based on information inputted from the minus-side input section 311 or the plus-side input section 312 of the adjustment amount input means 303. If a change in operation pattern of the tactile device is desired (for example, if the direction of the wave motion described above with reference to FIGS. 15 to 17 should be changed), the tactile pattern input section 45 is manipulated as appropriate.

[0192] Subsequently, step S213 changes or alters the table map to the increase side or the decrease side based on the information received from the preceding step ST212. Then, step ST214 activates the tactile device to thereby allow the driver to feel the adjusted operation pattern (tactile pattern) of the target tactile device.

[0193] Subsequently in step ST215, a signal from the adjustment permission switch 302 is read in, and the next step ST216 determines whether the signal from the adjustment permission switch 302 is in the OFF state or not. If the determination shows the ON state (NO), the control procedure returns to step ST211. Alternatively, if the OFF state is determined for the adjustment permission switch signal (YES), the control procedure goes on to step ST217 where the table map is renewed or updated.

[0194] Operations performed in steps ST208 to ST217 will be described in further details on condition that a table map showing a correlation between the frequency of the tactile pattern (wave motion) and the lateral acceleration acting on